Alg. 2 Warm Up #12-2

1. Factor:

a) $8x^3y^2 - 2x^7y^3$ $2x^3y^2(4 - x^4y)$

b) $36x^2 - 1$ $(6x+1)(6x-1)$

2. Simplify:

a) $\frac{x+2}{x} - \frac{3}{x^2}$

b) $\frac{x+1}{x+2} - \frac{x}{x+4}$

3. Find the intersections of the graphs:

$y = -(x-4)^2 + 9$ and $y = 0.25(2)^x$

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2. Simplify:

a) $LCD = x^2$

$\frac{x}{x} \cdot \frac{x+2}{x} - \frac{3}{x^2}$

$\frac{x^2+2x}{x^2} - \frac{3}{x^2}$

$\frac{x^2+2x-3}{x^2}$

b) $LCD = (x+2)(x+4)$

$\frac{(x+4)}{(x+4)} \cdot \frac{(x+1)}{x+2} - \frac{x}{x+4} \cdot \frac{x+2}{x+2}$

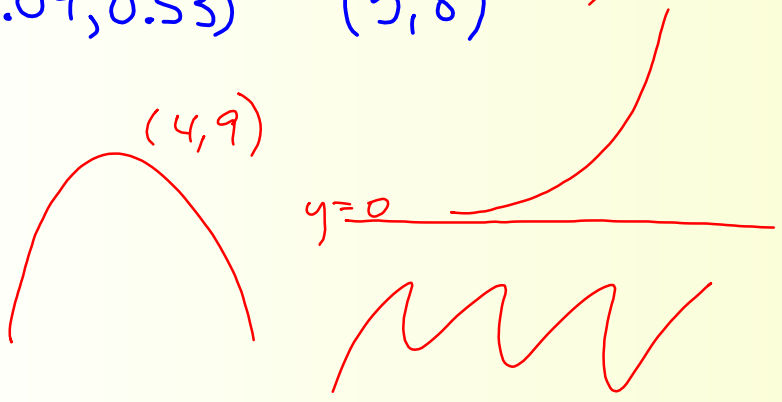
$\frac{x^2+5x+4-(x^2+2x)}{(x+2)(x+4)}$

$\frac{3x+4}{(x+2)(x+4)}$

3. Find the intersections of the graphs:

$y = -(x-4)^2 + 9$ and $y = 0.25(2)^x$

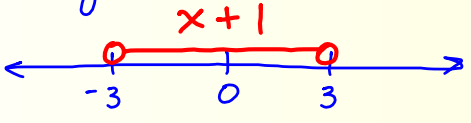
$\approx (1.09, 0.53)$ $(5, 8)$



Solve:

$|x + 1| < 3$

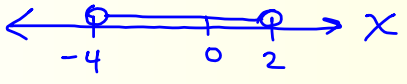
Meaning: $(x+1)$ is less than 3 units away from 0 on the number line



$-3 < x+1 < 3$

$-1 \quad -1 \quad -1$

$\boxed{-4 < x < 2}$



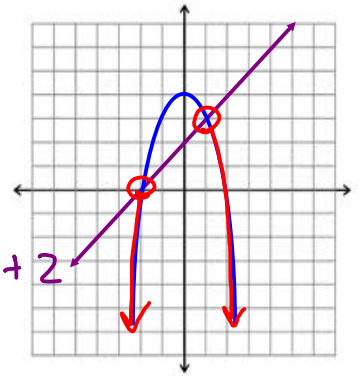
Solve:

$$-x^2 + 4 < x + 2$$

Meaning: Where is the parabola less than (under) the line?

$x < -2$ or $x > 1$

$y = -x^2 + 4$



$y = x + 2$

HW Questions:

Review & Preview

4-65. Find boundary points for each of the following inequalities. Draw the boundaries on a number line and shade the solution regions.

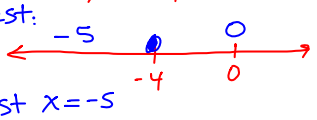
a. $3x + 2 \geq x - 6$

$3x + 2 = x - 6$

$2x = -8$

$x = -4$ ← Boundary Point

test:



Test $x = -5$

$3(-5) + 2 \stackrel{?}{\geq} -5 - 6$

$-15 + 2 \stackrel{?}{\geq} -11$

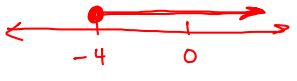
$-13 \not\geq -11$

Test $x = 0$

$3(0) + 2 \stackrel{?}{\geq} 0 - 6$

$2 \geq -6$ ✓

Solution: $x \geq -4$



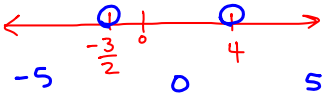
b. $2x^2 - 5x < 12$

$2x^2 - 5x - 12 = 0$

$(2x + 3)(x - 4) = 0$

$x = -\frac{3}{2}, 4$

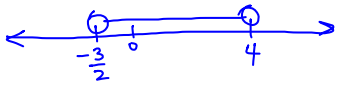
2 Boundary points means three regions to test.



test: -5 0 5

Since $x = 0$ works in the inequality, then solution:

$-\frac{3}{2} < x < 4$

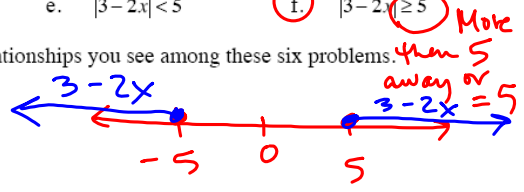


4-66. Solve the following inequalities and draw a number line graph to represent each solution.

a. $|2x+3|<5$ b. $|2x+3|\geq 5$ c. $|2x-3|<5$

d. $|2x-3|\geq 5$ e. $|3-2x|<5$ f. $|3-2x|\geq 5$

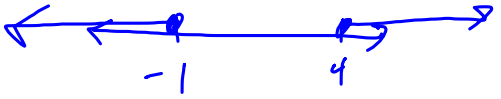
g. Describe any relationships you see among these six problems.



$3-2x \leq -5$ or $3-2x \geq 5$

$\frac{-2x}{-2} \leq \frac{-8}{-2}$ $\quad \frac{-2x}{-2} \geq \frac{2}{-2}$

$x \geq 4$ $\quad x \leq -1$



$x \leq -1$ or $x \geq 4$

4-67. Solve each equation for y so that it could be entered into a graphing calculator.

a. $5-(y-3)=3x$ b. $4(x+y)=-2$

4-68. Solve each equation below. Remember to check for extraneous solutions.

a. $(y-3)^2 = 2y-10$

$y^2-6y+9=2y-10$

$y^2-8y+19=0$

use quadratic formula.

b. $|y-3| = 2y-10$

$y-3 = 2y-10$ or $y-3 = -(2y-10)$

$y = 7$ or $y = \frac{13}{3}$

check: $\left|7-3\right| \stackrel{?}{=} 2(7)-10$

$4 = 14-10$

yes

$\left|\frac{13}{3}-3\right| \stackrel{?}{=} 2\left(\frac{13}{3}\right)-10$

$\left|-\frac{14}{3}\right| \stackrel{?}{=} \frac{26}{3}-\frac{30}{3}$

$\frac{14}{3} \neq -\frac{4}{3}$

$x = \frac{13}{3}$ is extraneous

So, only $x = 7$

4-69. Add, subtract, multiply, or divide the following rational expressions. Then simplify your expression, if possible.

a. $\frac{x-4}{2x^2+9x-5} + \frac{x+3}{x^2+5x}$

b. $\frac{4x^2-11x+6}{2x^2-x-6} - \frac{x+2}{2x+3}$

c. $\frac{(x+4)(2x-1)(x-7)}{(x+8)(2x-1)(3x-4)} \div \frac{(4x-3)(x-7)}{(x+8)(3x-4)}$

d. $\frac{2m^2+7m-15}{m^2-16} \cdot \frac{m^2-6m+8}{2m^2-7m+6}$

$\frac{(4x-3)(x-2)}{(2x+3)(x-2)} - \frac{(x+2)}{(2x+3)}$

$\frac{4x-3}{2x+3} - \frac{(x+2)}{2x+3}$

$\frac{3x-5}{2x+3}$

1·6
2·3

#69a)

$$\frac{x}{x} \cdot \frac{(x-4)}{2x^2+9x-5} + \frac{(x+3)}{x^2+5x} \cdot \frac{(2x-1)}{(2x-1)}$$

$$\frac{x}{x} \cdot \frac{(x-4)}{(2x-1)(x+5)} + \frac{(x+3)}{x(x+5)} \cdot \frac{(2x-1)}{(2x-1)}$$

$$\frac{x(x-4)+(x+3)(2x-1)}{x(2x-1)(x+5)}$$

$$\frac{x^2-4x+2x^2+5x-3}{x(2x-1)(x+5)}$$

$$\boxed{\frac{3x^2+x-3}{x(2x-1)(x+5)}}$$

4-70. Using the technique of completing the square, solve $x^2+12x+15=75$ for x.

$-15 \quad -15$

$x^2+12x+\underline{36} = 60+\underline{36}$

$\left(\frac{12}{2}\right)^2 = 36$

$\sqrt{(x+6)^2} = \pm\sqrt{96}$

$\sqrt{96} = \sqrt{16 \cdot 6}$

$4\sqrt{6}$

$x+6 = \pm\sqrt{96}$

$-6 \quad -6$

$$\boxed{x=-6+4\sqrt{6} \text{ and } x=-6-4\sqrt{6}}$$

4-71. Factor each expression in parts (a) and (b). Then, in parts (c) and (d), factor and simplify each expression.

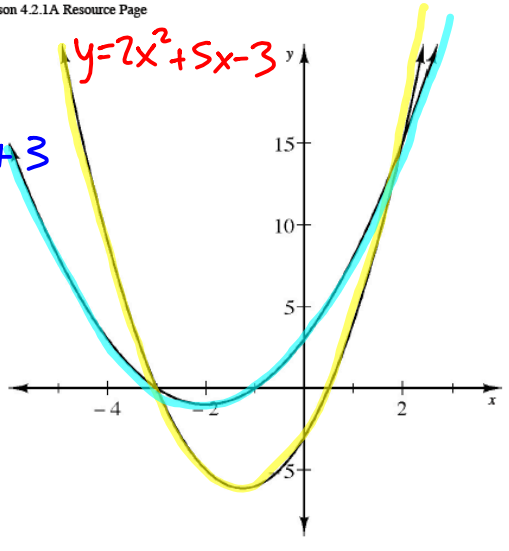
a. $bx + ax$ b. $x + ax$ c. $\frac{ax+a}{x^2+2x+1}$ d. $\frac{x^2-b^2}{ax+ab}$

Yesterday's CP's:

4 - #58

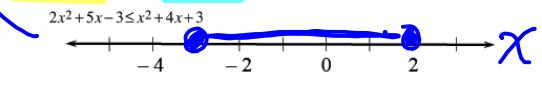
$y = x^2 + 4x + 3$

$y = 2x^2 + 5x - 3$



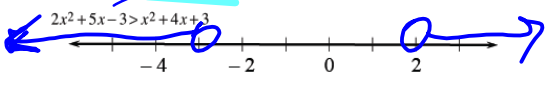
$-3 \leq x \leq 2$

$2x^2+5x-3 \leq x^2+4x+3$



$x < -3$ or $x > 2$

$2x^2+5x-3 > x^2+4x+3$



4-59. Consider the inequality $4|x+1|-2>6$.

a. How many boundary points are there? Remember that, in this case, a **boundary point** would be the smallest number that will make the inequality *not* true. What are the boundary points? Should they be marked with filled or unfilled circles? Make the appropriate markings on a number line.

b. Which portion(s) of the number line contain the solutions for this inequality? How many regions do you need to test? Represent the solutions algebraically and on a number line.

4-60. Burt and Ernie were solving the inequality $2x^2+5x-3<x^2+4x+3$. They were looking at the graph in problem 4-58 when Burt had an idea. *"Can't we change this into one parabola and solve our inequality that way?"* he said.

Ernie asked, *"What do you mean?"*

"Can't we find the solutions by looking at the graph of $f(x)=x^2+x-6$*?"* Burt replied.

a. Where did Burt get the equation $y=x^2+x-6$?

b. Try Burt's idea. Graph the parabola and show how it can be used to solve the original inequality.

c. *"Just a minute!"* mumbled Ernie, *"I think I have a short cut. Instead of graphing the parabola, can't we just rewrite the original inequality as* $x^2+x-6<0$ *and then solve the equation* $x^2+x-6=0$*? This would give us the boundary points and then we could test numbers to find the regions that contain the solutions."* Check Ernie's short cut. Does it give the same solution?

d. Use any method to solve the inequality $x^2-3x-10\geq 0$.

4-61. Next, Burt and Ernie were working on solving the inequality $4|x+1|-2>6$ from problem 4-59. This time, Ernie had an idea. *"Why don't we find the solutions to this by graphing a system of equations like we did in problem 4-58?"*

a. What system of equations should they graph?

b. Graph the system and explain how you can use it to find the solutions to $4|x+1|-2>6$.

4-62. In problem 4-58 you looked at solutions to an inequality with one variable (x). Now consider the system of inequalities with two variables (x and y) below.

$$y \geq 2x^2+5x-3$$
$$y < x^2+4x+3$$

a. Which points make both inequalities true? For example, does the point $(-3,0)$ make both inequalities true? What about $(-1,1)$? $(1,5)$? Refer back to your Lesson 4.2.1A Resource Page to help you think about these questions.

b. What is the difference between a solution to the *system* of inequalities above and a solution to the inequality found in problem 4-58?

c. How are the graphs of the equations $y=2x^2+5x-3$ and $y=x^2+4x+3$ related to the graph of the system of inequalities?

d. With your team, find a way to represent all of the solutions to the system of inequalities on the Lesson 4.2.1A Resource Page graph.

Classwork Week 12
Warm up
4- #47---> 49a (yellow)
4- #58--->63 with the resource page 4.2.1 A & B

HW: 4-

72 ---> 78

Quiz #8 (Wednesday):

* Add & Subtract Rational Expressions
* Factor Completely
* Finding an intersection of 2 graphs on the graphing calculator